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EXAMINER	
KIM, HONG CHONG	
ART UNIT	**PAPER NUMBER**
2185	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/602,254	FOX ET AL.	
	Examiner	Art Unit	
	Hong C. Kim	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 21-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 21-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. Claims 1-13 and 21-28 are presented for examination. This office action is in response to the amendment filed on 10/26/05.

Information Disclosure Statement

2. Applicants are reminded of the duty to disclose information under 37 CFR 1.56.

The examiner requests, in response to this Office action, any reference(s) known to qualify as prior art under 35 U.S.C. sections 102 or 103 with respect to the invention as defined by the independent and dependent claims. That is, any prior art (including any products for sale) similar to the claimed invention that could reasonably be used in a 102 or 103 rejection. This request does not require applicant to perform a search. This **request** is not intended to interfere with or go beyond that **required** under 37 C.F.R. 1.56 or 1.105.

The request may be fulfilled by asking the attorney(s) of record handling prosecution and the inventor(s)/assignee for references qualifying as prior art. A simple statement that the query has been made and no prior art found is sufficient to fulfill the request. Otherwise, the fee and certification requirements of 37 CFR section 1.97 are waived for those documents submitted in reply to this request. This waiver extends only to those documents within the scope of this request that are included in the application's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this request and any information

disclosures beyond the scope of this are subject to the fee and certification requirements of 37 CFR section 1.97.

In the event prior art documentation is submitted, a discussion of relevant passages, figs. etc. with respect to the claims is requested. The examiner is looking for specific references to 102/103 prior art that identify independent and dependent claim limitations. Since applicant is most knowledgeable of the present invention and submitted art, his/her discussion of the reference(s) with respect to the instant claims is essential. **A response to this inquiry is greatly appreciated.**

The examiner also requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line number(s), in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

Claim Rejections - 35 USC § 112

3. Claims 1-13 and 25-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It appears that added limitation of "delaying executing of a second data transfer command to transfer speculative data in lieu thereof" was not described in the specification at the time the application was filed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-13 and 21-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Olds et al. (Olds) US Patent Pub No. 20030105919.

As to claim 1, Olds discloses a method comprising the steps of executing a first data transfer command (block 6 lines 1-5) and delaying executing of a second data transfer command (block 9 line 6 and block 10 delaying command in favor of executing previously requested access) to transfer speculative data (block 8 lines 6-8, not specifically requested the data from data blocks) in lieu thereof (block 9 lines 5-12, read additional blocks reads on this limitation).

As to claim 2, Olds discloses the invention as claimed above. Olds further discloses wherein the delaying step further comprises a step of adjudging a utility of the speculative data to be higher than a utility of second data associated with execution of said second command (block 9 lines 5-12, read additional blocks reads on this limitation since additional blocks are read before executing the second command).

As to claim 3, Olds discloses the invention as claimed above. Olds further discloses wherein the speculative data are transferred through a next available latency period for the second command (block 7 and block 9 lines 5-12, read additional blocks reads on this limitation since additional blocks are read before executing the second command and the second command is still pending).

As to claim 4, Olds discloses the invention as claimed above. Olds further discloses wherein the speculative data are transferred during a time period commencing with conclusion of the execution of the first command and concluding prior to a latency period for execution of a third command (block 6 lines 1-3, multiple I/O commands in a command queue reads on this limitation and blocks 8-10)

As to claim 5, Olds discloses the invention as claimed above. Olds further discloses in which the first command precedes and is directly adjacent the second command in an execution sequence command (block 6 lines 1-3, multiple I/O commands in a command queue reads on this limitation)

As to claim 6, Olds discloses the invention as claimed above. Olds further discloses in which the first command precedes and is nonadjacent the second command in an execution sequence (block 6 lines 4-5, in an order different than that received reads on this limitation).

As to claim 7, Olds discloses the invention as claimed above. Olds further discloses wherein the first command is a data retrieval command (block 6 lines 1-3, I/O commands in a command queue reads on this limitation).

As to claim 8, Olds discloses the invention as claimed above. Olds further discloses wherein the first command is a data transmission command (block 6 lines 1-3, I/O commands in a command queue reads on this limitation).

As to claim 9, Olds discloses the invention as claimed above. Olds further discloses wherein the speculative data are acquired in conjunction with first data acquired from execution of the first command (Block 9) .

As to claim 10, Olds discloses the invention as claimed above. Olds further discloses in which resolution of the amount of speculative data (block 7) transferred dining the delaying step is resolved to be a predetermined constant amount of data (block 7).

As to claim 11, Olds discloses the invention as claimed above. Olds further discloses in which resolution of the amount of speculative data transferred during the delaying step is resolved to be a percentage of a buffer segment of a memory (block 15).

As to claim 12, Olds discloses the invention as claimed above. Olds further discloses in which resolution of the amount of speculative data transferred during the delaying step is resolved based on an analysis of previous commands (blocks 6, 7, 9).

As to claim 13, Olds discloses the invention as claimed above. Olds further discloses in which resolution of the amount of speculative data transferred during the delaying step is resolved based on an amount of remaining space within a buffer segment of a memory (block 15).

As to claim 21, Olds discloses a method comprising steps of transferring first data in response to an execution of a first pending command (block 6), and transferring speculative data (block 9 lines 5-12, read additional blocks reads on this limitation) instead of second data associated with a second pending command (block 9 line 6 and block 10 also discloses delaying command in favor of executing previously requested access) during a next available latency period for the second command when the speculative data are adjudged as having a utility greater than a utility of the second data (block 7).

As to claim 22, Olds discloses the invention as claimed above. Olds further discloses the method of claim 21, further comprising steps of receiving the first and second commands in a queue (block 6), and executing a command execution algorithm

that identifies the second command as a next best command to be executed after execution of the first command (block 7).

As to claim 23, Olds discloses the invention as claimed above. Olds further discloses a subsequent step of transferring the second data in response to execution of the second command after the transferring speculative data step (blocks 8 and 9).

As to claim 24, Olds discloses the invention as claimed above. Olds further discloses wherein the second command is a write-back command (block 60).

As to claim 25, Olds discloses an apparatus comprising a controller configured to execute a first data transfer command (block 6 lines 1-5), and to delay execution of a second data transfer command (block 9 line 6 and block 10 delaying command in favor of executing previously requested access) to transfer speculative data (block 8 lines 6-8, not specifically requested the data from data blocks) in lieu thereof (block 9 lines 5-12, read additional blocks reads on this limitation).

As to claim 26, Olds discloses the invention as claimed above. Olds further discloses wherein the controller is further configured to adjudge a utility of the speculative data to be higher than a utility of second data associated with execution of said second command (block 7).

As to claim 27, Olds discloses the invention as claimed above. Olds further discloses wherein tire controller is further configured to subsequently execute the second command to transfer second data after transfer of the speculative data (block 9).

As to claim 28, Olds discloses the invention as claimed above. Olds further discloses wherein the controller is characterized as a controller of a data storage device (Fig. 3, Disk).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuumi et al. (Furuumi) US Patent Application Pub No. 2002/0052985 in view of The Cache Memory book, Jim Handy, Academic Press, Inc., 1993, pp 5-8 and 64-84 (Handy).

As to claim 1, Furuumi discloses a method (Fig. 1) comprising the steps of executing a first data transfer command (ccw1 block 61) and delaying executing of a

second data transfer command (ccw2 block 61 waiting staging completion reports reads on this limitation) to transfer data (target data in block 68 during cache miss) in lieu thereof (block 61 waiting staging completion reports reads on this limitation). However, Furuumi does not specifically disclose speculative data.

Handy discloses speculative data (pp 6, 72, and 84, spatial locality and reading in additional cache data during cache miss read on this limitation) for the purpose of increasing system speed.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate speculative data as taught by Handy into the system of Furuumi for the advantages stated above.

As to claim 21, Furuumi discloses a method comprising steps of transferring first data in response to an execution of a first pending command (block 61), and transferring data (target data in block 68 during cache miss) instead of second data associated with a second pending command (Fig. 1 CCW 2) during a next available latency period for the second command when the data are adjudged as having a utility greater than a utility of the second data (block 61 waiting staging completion reports reads on this limitation).

Handy discloses speculative data (pp 6, 72, and 84, spatial locality and reading in additional cache data read on this limitation) for the purpose of increasing system speed.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate speculative data as taught by Handy into the system of Furuumi for the advantages stated above.

As to claim 25, Furuumi discloses an apparatus comprising a controller configured to execute a first data transfer command (ccw1, block61) and , and to delay execution of a second data transfer command (ccw2, block 61 waiting staging completion reports reads on this limitation) to transfer data (target data in block 68 during cache miss) in lieu thereof (block 61 waiting staging completion reports reads on this limitation). However, Furuumi does not specifically disclose speculative data.

Handy discloses speculative data (pp 6, 72, and 84, spatial locality and reading in additional cache data read on this limitation) for the purpose of increasing system speed.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate speculative data as taught by Handy into the system of Furuumi for the advantages stated above.

Response to Amendment

1. Applicant's arguments filed on 10/26/05 have been fully considered but they are not deemed to be persuasive.

Applicant's remarks that the references not teaching delaying executing of a second data transfer command to transfer speculative data in lieu thereof is not considered persuasive.

Olds discloses delaying executing of a second data transfer command (block 9 line 6 and block 10 delaying command in favor of executing previously requested access) to transfer speculative data (block 8 lines 6-8, not specifically requested the data from data blocks) in lieu thereof (block 9 lines 5-12, read additional blocks reads on this limitation)

Handy discloses delaying executing of a second data transfer command to transfer speculative data in lieu thereof (pp 6, 72, and 84, spatial locality and reading in additional cache data (prefetching) during cache miss read on this limitation).

Therefore broadly written claims are disclosed by the references cited.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached PTO-892.

2. **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

3. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. ' 1.111(c).

4. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hong Kim whose telephone number is (571) 272-4181. The examiner can normally be reached on M-F 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 whose telephone number is (571) 272-2100.

6. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

7. **Any response to this action should be mailed to:**

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to TC-2100:
571-273-8300

Hand-delivered responses should be brought to the Customer Service Window (Randolph Building, 401 Dulany Street, Alexandria, VA 22314).

HK
Primary Patent Examiner
December 11, 2005